

Answer
Key

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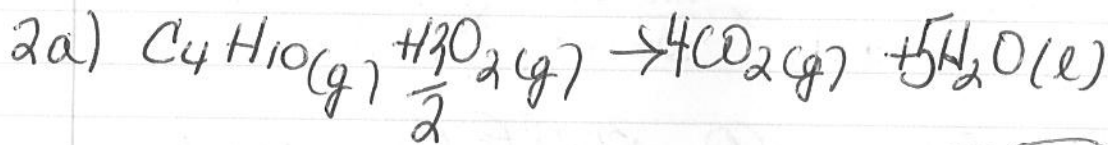
Stoichiometric Calculations

$$1a) 7 \text{ mol O}_2 \times \frac{25 \text{ mol O}_2}{2 \text{ mol O}_2} = 87.5 \text{ mol O}_2$$

$$b) 5 \text{ mol O}_2 \times \frac{16 \text{ mol CO}_2}{2 \text{ mol O}_2} = 40 \text{ mol CO}_2$$

$$c) 8 \text{ mol CO}_2 \times \frac{25 \text{ mol O}_2}{16 \text{ mol CO}_2} = 12.5 \text{ mol O}_2$$

$$d) 17 \text{ mol O}_2 \times \frac{16 \text{ mol CO}_2}{25 \text{ mol O}_2} = 10.88 \text{ mol CO}_2$$



$$b) 37 \text{ mol H}_2\text{O} \times \frac{1 \text{ mol C}_4\text{H}_{10}}{5 \text{ H}_2\text{O}} = 7.4 \text{ mol C}_4\text{H}_{10} \quad \text{butane}$$

$$c) 29 \text{ mol O}_2 \times \frac{4 \text{ mol CO}_2}{\frac{13}{2} \text{ mol O}_2} = 17.8 \text{ mol CO}_2$$

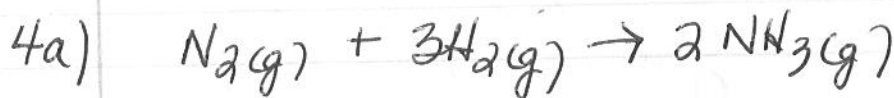
$$d) 17.5 \text{ mol O}_2 \times \frac{1 \text{ mol but}}{\frac{13}{2} \text{ mol O}_2} = 2.69 \text{ mol but}$$

$$3a) 4.0 \text{ mol Cu} \times \frac{2 \text{ mol NO}}{3 \text{ mol Cu}} = 1.6 \text{ mol NO}$$

$$b) 5.0 \text{ mol Cu} \times \frac{8 \text{ mol HNO}_3}{3 \text{ mol Cu}} = 13 \text{ mol HNO}_3$$

$$c) 6.35 \text{ g Cu} \times \frac{1 \text{ mol Cu}}{63.55 \text{ g}} \times \frac{8 \text{ mol HNO}_3}{3 \text{ mol Cu}} \times \frac{63 \text{ g}}{1 \text{ mol HNO}_3} = 16.8 \text{ g HNO}_3$$

-1, 14, 16 + 3 = 48



$$b) 30.0 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28 \text{ g N}_2} \times \frac{2 \text{ mol NH}_3}{1 \text{ mol N}_2} = 2.14 \text{ mol NH}_3$$

$$c) 45.0 \text{ g NH}_3 \times \frac{1 \text{ mol NH}_3}{17 \text{ g NH}_3} \times \frac{3 \text{ mol H}_2}{2 \text{ mol NH}_3} \times \frac{2 \text{ g H}_2}{1 \text{ mol H}_2} = 7.94 \text{ g H}_2$$

$$d) 38.5 \text{ g H}_2 \times \frac{1 \text{ mol H}_2}{2 \text{ g H}_2} \times \frac{1 \text{ mol N}_2}{3 \text{ mol H}_2} \times \frac{28 \text{ g N}_2}{1 \text{ mol N}_2} = 180. \text{ g N}_2$$

$$5) 25.00 \text{ g CO} \times \frac{1 \text{ mol CO}}{28 \text{ g CO}} \times \frac{3 \text{ mol Fe}_2\text{O}_3}{1 \text{ mol CO}} \times \frac{159.7 \text{ g}}{1 \text{ mol Fe}_2\text{O}_3} = 427.8 \text{ g Fe}_2\text{O}_3$$

55.45 x 2 = 111.7
Fe₂O₃
16 x 3 = 48

$$6) 50.00 \text{ g I}_2 \times \frac{1 \text{ mol I}_2}{253.8 \text{ g I}_2} \times \frac{1 \text{ mol K}_2\text{Cr}_2\text{O}_7}{3 \text{ mol I}_2} \times \frac{294 \text{ g}}{1 \text{ mol K}_2\text{Cr}_2\text{O}_7} = 19.31 \text{ g K}_2\text{Cr}_2\text{O}_7$$

-126.9 x 2 = 253.8
-39 x 2 = 78
-52 x 2 = 104
16 x 7 = 112

$$7) 35.00 \text{ g ICl} \times \frac{1 \text{ mol ICl}}{162.4 \text{ g}} \times \frac{2 \text{ mol I}_2}{5 \text{ mol ICl}} \times \frac{253.3 \text{ g I}_2}{1 \text{ mol I}_2} = 21.84 \text{ g I}_2$$

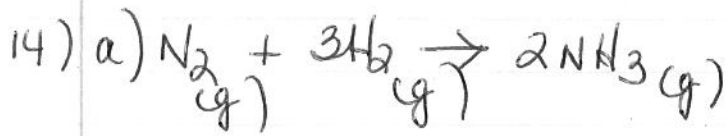
-126.9 / 3 = 42.3

$$8) 11.40 \text{ g KNO}_2 \times \frac{1 \text{ mol KNO}_2}{85 \text{ g}} \times \frac{2 \text{ mol KMnO}_4}{5 \text{ mol KNO}_2} \times \frac{157.9 \text{ g}}{1 \text{ mol KMnO}_4} = 8.471 \text{ g KMnO}_4$$

-39, 14, 16 x 2 = 32

$$9) 10.45g \text{ CuSO}_4 \times \frac{1 \text{ mol CuSO}_4}{159.55g} \times \frac{4 \text{ mol HI}}{2 \text{ mol CuSO}_4} \times \frac{128g}{1 \text{ mol HI}} = 16.77g \text{ HI}$$

$\frac{63.55}{32} \times 16 \times 4 = 64$ $\frac{1}{127}$



$$b) 25.0g \text{ Na} \times \frac{1 \text{ mol Na}}{23g} \times \frac{2 \text{ mol NH}_3}{1 \text{ mol Na}} \times \frac{22.4L}{1 \text{ mol NH}_3} = 40.0L \text{ NH}_3$$

(STP)

$$c) 50.0L \text{ NH}_3 \times \frac{1 \text{ mol NH}_3}{22.4L} \times \frac{3 \text{ mol H}_2}{2 \text{ mol NH}_3} \times \frac{2g}{1 \text{ mol H}_2} = 6.70g \text{ H}_2$$

$$15) 29.2g \text{ H}_2\text{O} \times \frac{1 \text{ mol H}_2\text{O}}{18g} \times \frac{1 \text{ mol O}_2}{2 \text{ mol H}_2\text{O}} \times \frac{6.02 \times 10^{23} \text{ molec O}_2}{1 \text{ mol O}_2} = 4.88 \times 10^{23} \text{ molec O}_2$$

$$16) 19.8L \text{ SO}_3 \times \frac{1 \text{ mol SO}_3}{22.4L} \times \frac{1 \text{ mol O}_2}{2 \text{ mol SO}_3} \times \frac{22.4L}{1 \text{ mol}} = 9.90L \text{ O}_2$$

$$17) a) 7.42 \times 10^{24} \text{ molec HF} \times \frac{1 \text{ mol HF}}{6.02 \times 10^{23} \text{ molec}} \times \frac{1 \text{ mol SnF}_2}{2 \text{ mol HF}} \times \frac{156.7g}{1 \text{ mol SnF}_2} = 966g \text{ SnF}_2$$

$\frac{-118.7}{19 \times 2 = 38}$

$$b) 23.4g \text{ Sn} \times \frac{1 \text{ mol Sn}}{118.7g} \times \frac{1 \text{ mol H}_2}{1 \text{ mol Sn}} \times \frac{22.4L}{1 \text{ mol H}_2} = 4.41L \text{ H}_2$$

$$c) 14.2L \text{ H}_2 \times \frac{2 \text{ mol HF}}{1 \text{ mol H}_2} = 28.4L \text{ HF}$$

it's all the about the mole ratio!

$$d) 80.0L \text{ HF} \times \frac{1 \text{ mol HF}}{22.4L} \times \frac{1 \text{ mol H}_2}{2 \text{ mol HF}} \times \frac{6.02 \times 10^{23} \text{ molec H}_2}{1 \text{ mol H}_2} = 1.08 \times 10^{24} \text{ molec H}_2$$